## **CLAIMS**

1. Optical system (10; 20) for a charged particle multi-beam system, comprising

an electrostatic lens component for a plurality of charged particle beams (12) comprising at least two electrostatic sub-lenses and

a magnetic lens component for a plurality of charged particle beams comprising at least two magnetic sub-lenses, whereby the sub-lenses share a common excitation coil (15);

the electrostatic and the magnetic lens component forming a multi-lens for a plurality of charged particle beams comprising at least two sub-lenses; each sub-lens comprising an opening (14) for a charged particle beam; and each sub-lens is adapted to focus a charged particle beam.

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Optical system according to any of the preceding claims, whereby each of
the at least two electrostatic sub-lenses comprises at least one electrode
(18), the electrodes of the at least two electrostatic sub-lenses being on a
common potential.

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- 3. Optical system according to any of the preceding claims, whereby each of the at least two electrostatic sub-lenses comprises at least a first and a second electrode (18, 19).
- 4. Optical system according to any of the preceding claims, whereby the first electrodes of the at least two electrostatic sub-lenses are on a common potential and the second electrodes of the at least two electrostatic sub-lenses are on a common potential.

- 5. Optical system according to any of the preceding claims, whereby the electrostatic lens component for a plurality of charged particle beams is an immersion lens component for a plurality of charged particle beams.
- 5 6. Optical system according to any of the preceding claims, whereby the electrostatic lens component for a plurality of charged particle beams is a retarding lens component for a plurality of charged particle beams.
- 7. Optical system (10; 20) according to any of the preceding claims, whereby the magnetic sub-lenses are radial-gap lenses.
  - 8. Optical system according to any of claims 1 to 6, whereby the magnetic sub-lenses are axial-gap lenses.
- 9. Optical system according to any of claims 1 to 6, whereby the magnetic sub-lenses are radial-axial-gap lenses.
- 10. Optical system according to any of the preceding claims, whereby a lens field area of the electrostatic sub-lens is below a lens field area of the respective magnetic sub-lens.
  - 11. Optical system according to any of claims 1 to 9, whereby a lens field area of the electrostatic sub-lens is above a lens field area of the respective magnetic sub-lens.

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12. Optical system according to any of claims 1 to 9, whereby a lens field area of the electrostatic sub-lens and a respective lens field area of the magnetic sub-lens overlap.

- 13. Optical system according to any of the preceding claims, whereby one electrode (18, 19) of each of the at least two electrostatic sub-lenses is on a beam boost potential.
- 5 14. Optical system (10; 20) according to any of the preceding claims, comprising means (102; 112) for fine focusing.
  - 15. Optical system according to any of the preceding claims, comprising an extraction electrode (122) component with an extraction electrode for each of the at least two charged particle beams.

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- 16. Optical system according to any of the preceding claims, comprising a scan deflection unit (144, 146; 152).
- 17. Optical system according to any of the preceding claims, comprising an individual scan deflection unit for each of the at least two charged particle beams.
- 18. Optical system according to any of claims 16 to 17, whereby the scan deflection unit is an in-lens scan deflection unit (152).
  - 19. Optical system according to any of the preceding claims, comprising a detection unit (162, 174).
- 25 20. Optical system according to claim 19, whereby the detection unit comprises a spectrometer.

21. Method for focusing at least two charged particle beams on a specimen, comprising the steps of:

providing an optical system with

an electrostatic lens component for a plurality of charged particle beams comprising at least two electrostatic sub-lenses, and

a magnetic lens component for a plurality of charged particle beams comprising at least two magnetic sub-lenses, and

at least two separate openings for each of the at least two charged particle beams traveling through the optical system,

controlling a current for an excitation coil of the magnetic lens component, thereby focusing the at least two electron beams;

controlling at least two potentials of the electrostatic lens component, thereby focusing the at least two electron beams;

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- 22. Method according to claim 21, whereby each of the electrostatic sublenses is provided with at least a first and a second electrode.
- 23. Method according to any of claims 21 to 22, controlling the first electrodes
   or the second electrodes separately for each of the at least two electrostatic sub-lenses.
  - 24. Method according to any of claims 21 to 23, further controlling focusing properties correction means.

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- 25. Method according to any of claims 21 to 24, further scanning the at least two charged particle beams over an area of the specimen.
- 30 26. Multiple charged particle beam device, comprising

a charged particle beam source (102);

a detector for detecting secondary particles (162);

beam shaping means (A);

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- a housing (191) for the charged particle beam column, whereby the housing can be evacuated;
- at least one optical system (20; 180) according to any of claims 1 to 20, and at least one control unit (7, 8, 9) for the at least one optical system.
  - 27. Multiple charged particle beam device (190) according to claim 26, further comprising a deflection unit (172a, 172b) for directing the charged particle beam away from the optical axis (11) and redirecting the charged particle beam.
  - 28. Multiple charged particle beam device according to any of claims 26 to 27, whereby the deflection unit comprises at least two magnetic deflectors (172a, 172b).